

Research

Reptile Studies Report 2019

Introduction

During January 2019 a reptile studies course and survey was run at the Eyre Bird Observatory, located in the Nullarbor, Western Australia. A similar course was conducted six years ago in January 2013 with the same study design and aims. The objectives of this course/survey were firstly; to provide an up-to-date and accurate account of reptile species found in various habitat types in the area. Secondly, to compare the results and findings of this survey to the one conducted in 2013, and thirdly to provide an opportunity to teach skills in reptile survey methods, identification and handling to an enthusiastic group of participants.

The participants had a great time during the course and learnt many skills that will set them up to be budding herpetologists in the future. A variety of survey techniques were taught and utilised such as pit-fall and funnel traps, racking, hand capture, spotlighting, head torching and road spotting. Reptile identification workshops provided a good opportunity to key out and identify a variety of reptiles, particularly some of the more challenging lizards such as skinks. These skills were then put into practice in the field and everyone soon became proficient at identifying and processing animals. Participants gave very positive feedback about the course and have been inspired to further their knowledge and skill in herpetology.

The week of surveying was very successful with over 130 captures from 25 reptile, and two mammal species. Ten reptile species previously not observed or captured in the 2013 survey were observed on this survey, which was a pleasant surprise. In addition several of the reptile species that were captured had very few or no records from the Eyre Bird Observatory area which was very exciting. DNA samples were collected from 11 different species and lodged with the Western Australian Museum (see Appendix).

Methods

Study site

Three different habitat types with paired sites were selected to undertake the formal reptile survey using pitfall and funnel traps. Trapping sites were identical to the ones used for the 2013 survey. Habitat types were selected based on differences in vegetation structure, floristics and soil composition. These habitat types have been broadly classified as grassland, shrubland and woodland (See Appendix 1.5 -1.7).

Appendix 1.5: "Shrubland" site located at the Eyre Bird Observatory, showing typical interdune habitat dominated by *Acacia spp.*



Appendix 1.6: “Woodland” site located at the Eyre Bird Observatory, displaying Mallee Eucalyptus that dominated this area.



Appendix 1.7: “Grassland” site located at the Eyre Bird Observatory, illustrating sedges that dominated the habitat.



Grassland sites were dominated by grass and sedge species that were less than 50 centimetres tall. White sandy soil with little leaf litter and sparse vegetation provided approximately 50% bare ground. Mallee Eucalyptus trees that were up to seven metres in height dominated Woodland sites. These areas typically had a thick cover of leaf litter, sparse understory consisting mainly of shrubs and a canopy cover that exceeded 50% in most areas. The soil was grey to white with irregular areas of broken up limestone rocks. Shrubland areas consisted predominantly of Acacia shrubs, one to two metres in height. Vegetation in this area was very thick with little leaf litter on the ground. These sites were situated in a system of inter-dunes and therefore the substrate was made up of fine white sandy soil.

The group ventured out to the old homestead, Burnabbie, located at the base of the scarp about 15km from the current EBO homestead. The drive out was very interesting, particularly to observe the regrowth of the vegetation that was severely burnt in the 2016 wildfire. We encountered an adult Dugite foraging in various burrows and diggings into and through the substrate. This observation was quite unique and not often seen. The Dugite was unfazed by 12 people watching intently on this unique behaviour. The area surrounding Burnabbie had a diverse range of habitats with the low lying area moving away from the scarp dominated by low lying salt bush situated on loamy soils. Moving up the scarp the vegetation transitioned to mallee woodland with scattered granite and limestone rock. We had great fun in finding and capturing some unique reptiles opportunistically, four of which were only observed at Burnabbie.

Survey design

Pitfall and funnel traps were utilised as the primary method of surveying reptiles. Paired sites were established at woodland, shrubland and grassland habitat types, totalling six sites. Each site consisted of 10 pitfall and five funnel traps, arranged in an L-shape configuration (Figure 1). Therefore there was a total of 60 pitfall and 30 Funnel traps for the survey. Pitfall traps were spaced five metres apart, connected along a 30cm high aluminium drift fence. Funnel traps were placed against the drift fence

at the ends of the L-shape array with two placed at each extremity and one funnel placed on the longest arm where the two arms meet (Figure 1).

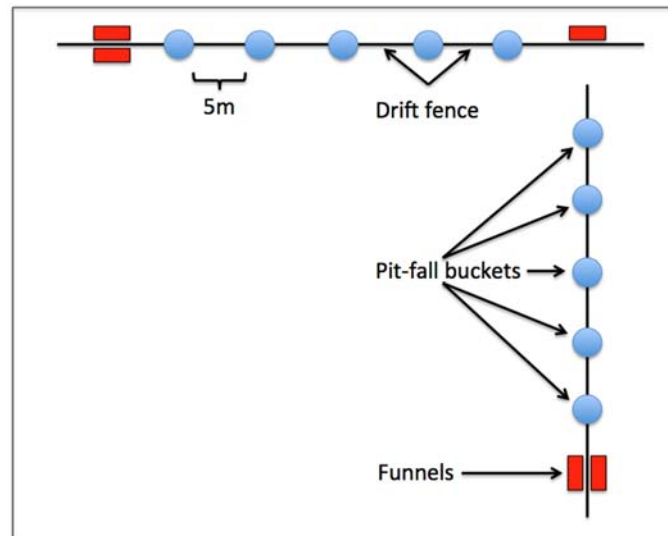


Figure 1: Pitfall and funnel trap design with connecting drift fence.

Pitfall traps were installed using 20 Litre buckets that were dug into the ground, level with the soil surface. Two centimetres of soil some leaf litter, half an egg carton and a meat tray were placed in the base of buckets to provide shelter. Funnels were covered with shade cloth to prevent animals over heating during the day. Traps were setup and opened on the morning of the 14th of January and closed in the late afternoon of the 18th of January. Traps were left open for five days and four nights and checked twice daily for this time period. Total number of trap nights was 240 pitfall traps and 120 funnel traps i.e. (4x 60 pitfall + 4x 30 funnel traps).

All traps were checked and cleared of animals between 6-9am in the morning and 2-5pm in the afternoon. Animals captured during the trapping sessions were identified to the species level, processed, marked and released (see Appendix trap check and animal data sheets. Opportunistic sampling such as raking, head torching and hand capture were employed throughout the week in and around Eyre Bird Observatory. Species captured opportunistically were identified and contributed to the total species richness for the survey but were excluded from the formal pitfall and funnel trapping analysis.

Results

Summary

A total of 134 reptiles were captured during the week of surveying, 83 from funnel and pitfall traps and 51 opportunistically. In total 25 different reptile species were captured or observed from seven reptile families (Table 2). Ten of these species were not observed in the 2013 survey which is quite significant, these have an * in front of the scientific names in Table 2. Six of these ten species were captured opportunistically with the remaining four being captured in funnel or pitfall traps. In 2013 one species, *Aprasia inaurita* (Red-tailed Worm-lizard) was captured but was not observed during this 2019 survey. Two mammal species were captured in the survey, the Western Pygmy Possum

(*Cercartetus concinnus*) and the introduced House Mouse (*Mus musculus*). Five male *C. concinnus* were caught, four in woodland site 2 and one in shrubland site 1. *Mus musculus* were widespread, two captures in shrubland and grassland and one in woodland. The following assessment of results will pertain to reptile species captured in funnel and pitfall traps only i.e. 13 of the 25 species.

Species richness and capture rates

The highest species richness occurred in woodland and shrubland habitats both with 10 different species, whereas the grassland had six species (Figure 3). Interestingly, woodland and grassland had the highest number of individuals captured at 29 and shrubland with fewer individuals 25 (Figure 3).

Ctenophorus maculatus and *Morethia obscura* were the most numerous species captured 23 and 17 times respectively. These species were recorded in each habitat type, however captures rates varied between habitat types (Figure 2). In contrast *Cryptoblepharus pulcher*, *Ctenophorus chapmani*, *Pygopus lepidopodus* and *Delma australis* were only captured once and were found in either woodland or shrubland sites exclusively (Figure 2).

Reptile assemblages in each habitat type

Five species were captured in all habitat types, these included; *Ctenophorus maculatus*, *Lerista baynesi*, *Lerista distinguenda*, *Menetia greyii* and *Morethia obscura* (Figure 2). Five species were exclusively found in one habitat type these include *Cryptoblepharus pulcher*, *Morethia adelaidensis* and *Ctenophorus chapmani* in woodlands only; *Delma australis*, *Pygopus lepidopodus* were captured in shrublands only (Figure 2). In addition, *Ctenotus euclae* was captured in grasslands and shrublands but not woodland and *Diplodactylus calcicolus* and *Hemiergis initialis* were captured in shrubland and woodland but not grassland (Figure 2).

Opportunistic sampling

Opportunistic sampling using methods such as racking, hand capture and spotlighting was very successful in detecting species that were cryptic and less likely to be trapped using conventional techniques. Fifteen species were capture/observed opportunistically of which only three were captured the in funnel or pitfall traps (Table 2). The visit to Burnabbie was very rewarding with seven species observed in this location. These included *Tiliqua rugosa*, *Strophurus intermedius*, *Heteronotia binoei*, *Amphibolurus norrisi*, *Ctenophorus pictus*, *Cryptoblepharus pulcher*, *Pseudonaja affinis*. Other noteworthy species captured opportunistically were *Drysdalia mastersii*, *Echiopsis curta*, *Tiliqua occipitalis*, *Liopholis multiscutata* and *Underwoodisaurus milii*, which were found in and around the EBO.

Nullarbor Endemics and Unique Records

The Nullarbor is an interesting region of Australia, known for its unique flora, fauna and overall biodiversity. This region illustrates a fantastic example of the change in biogeography in southern Australia. Many species that are widespread are absent from the Nullarbor and many others are only found here. Fifteen of the 25 species captured during the survey are unique records, either because they are endemic species/subspecies, are at the extremity of their geographical range or there are very few records (Table 1). For example *Ctenophorus chapmani*, *Ctenotus euclae*, *Lerista baynesi* are only found in the Nullarbor and nowhere else on earth. Several species have no official records from where they were recorded such as *Strophurus intermedius*, *Tiliqua occipitalis*, which displays the importance of reptile surveys in areas less explored.

Table 1: Reptile species captured that are endemic to the Nullarbor or unique to the Eyre Bird Observatory.

Family	Scientific name	Common name	Endemism and/or Uniqueness
Diplodactylidae: Diplodactylid Geckos	<i>Diplodactylus calcicolus</i>	South Coast Gecko	Coastal areas of southern Australia
	<i>Strophurus intermedius</i>	Southern Spiny-tailed Gecko	Few records from the Nullarbor
Agamidae: Dragons	<i>Amphibolurus norrisi</i>	Mallee Tree Dragon	Restricted to the Nullarbor and SA coast
	<i>Ctenophorus chapmani</i>	Southern Heath Dragon	Nullarbor endemic
	<i>Ctenophorus maculatus dualis</i>	Spotted Military Dragon	Subspecies restricted to Nullarbor
	<i>Ctenophorus pictus</i>	Painted Dragon	Western extent of range
Scincidae: Skinks	<i>Cryptoblepharus pulcher clarus</i>	Elegant Snake-eyed Skink	Subspecies restricted to coastal areas of southern Australia
	<i>Ctenotus euclae</i>	Bight Wedge-snouted Ctenotus	Nullarbor endemic
	<i>Hemiergis initialis brookeri</i>	Western Earless Skink	Subspecies restricted to Nullarbor
	<i>Lerista baynesi</i>	Bayne's Slider	Nullarbor endemic
	<i>Liopholis multiscutata</i>	Bull Skink	Isolated population in western Nullarbor
	<i>Tiliqua occipitalis</i>	Western Bluetongue	Little records from the Nullarbor
	<i>Tiliqua rugosa aspera</i>	Skingleback	Subspecies restricted to Nullarbor
Elapidae: Front-fanged venomous snakes	<i>Drysdalia mastersii</i>	Master's Snake	Restricted to coastal areas of southern Australia
	<i>Echiopsis curta</i>	Bardick	Most eastern extent in WA population

Discussion

Reptile assemblages in different habitats

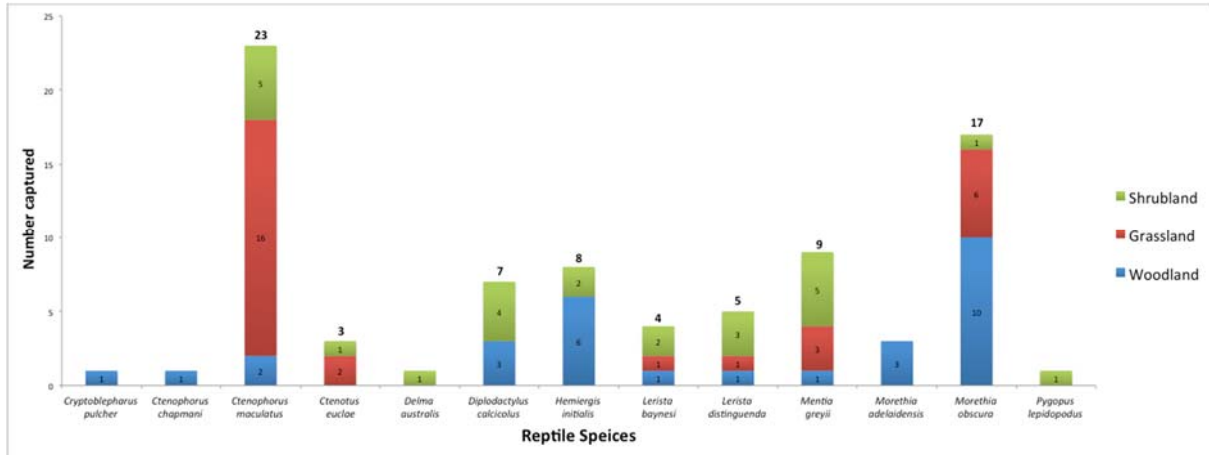


Figure 2: Total number of individuals captured from each species (number above bars on graph) and number of individuals captured for each species in each habitat type.



Figure 3: Total number of individual reptiles captured (83) for each habitat type (left) and total species (13) captured per habitat (right) using pitfall and funnel traps (excluding opportunistic captures).

Discussion

Reptile assemblages in different habitats

Shrubland habitats supported ten different species including the only captures of pygopods; *Pygopus lepidopodus* and *Delma australis*. Several fossorial and leaf litter dwelling specialists were present at these sites such as *Lerista distinguenda*, *Lerista baynes*, *Hemiernis initialis* and *Menetia greyii*. Shrubland sites captured the greatest number of *Diplodactylus calcicolus*. Shrubland habitats appear to support a diverse range of species covering various niche environments.

Six species were captured in grassland habitats which was considerably lower than the ten species captured in woodland and shrubland sites. *Ctenophorus maculatus* dominated the overall captures in grassland habitats and were captured in this habitat more than shrubland and woodland combined. This species was very common, often observed while checking traps in the surrounding area. *Ctenophorus maculatus* appeared to have a preference for a higher percentage of bare ground than the grassland habitats provided. Benefits of an open canopy and high bare ground cover increase time to reach optimal thermal temperature and aid in visual communication for courting and breeding. This species is very fast moving with its long legs and streamline body and tail which provides a good body type for avoiding predators. Species that were notably absent from grassland sites were *Diplodactylus calcicolus* and *Hemiernis initialis*. The absence of shrubs and leaf litter may be some of the reasons why these species are absent.

A diverse community of reptiles were captured in the woodland sites. Three species were exclusively captured in these sites, *Cryptoblepharus pulcher*, *Ctenophorus chapmani*, *Morethia adalaidensis*. The highest captures of *Hemiernis initialis* occurred in woodland sites. The presence of *Cryptoblepharus pulcher* can be attributed to the woodland sites providing of mid and upper vegetation structure which this species has a preference for. Leaf litter from the Mallee Eucalypts provided suitable coverage for *Hemiernis initialis*, which had high capture rates in the pit-fall and Elliot traps as well as racking in the leaf litter. *Ctenophorus maculatus* were captured very few times in the Mallee woodlands and rarely seen opportunistically which supports the theory of this species having a preference for habitats with an open canopy and bare ground.

Conclusion

The week of surveying was very successful with several range extensions and over 10 species that previously were not observed. Genetic samples were also taken and lodged with the Western Australian Museum from 11 reptile species. The eight participants had a really good and enjoyable time and learnt many important components of conducting a fauna survey such as site selection, utilising various trapping techniques and processing of reptiles.

Acknowledgments

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Painted Dragon (*Ctenophorus pictus*) found at Burnabbie



Southern Heath Dragon (*Ctenophorus chapmani*) only individual captured



Master's Snake (*Drysdalia mastersii*) showing the colour and patterning of the dorsal and ventral surface.





Male South Coast Gecko (*Diplodactylus calcicolus*)



Marbled-faced Delma (*Delma australis*).



Bayne's Slider (*Lerista baynesi*)



Western Bluetongue (*Tiliqua occipitalis*)



The team – roof left to right: Joe Porter, Richard Variakojis, Serin Subaraj. Below: Left to right: Kirsty Heiner, Todd Cracknell, Aidan Williams, Jenny Browne, Emma Johnston, Sam Chidgzey, Jack Eastward, Mandy and Steve Edwards.

Joe Porter